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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/523,381	11/21/2005	Mark J Childs	GB 020125	3722
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EXAMINER MCCOMMAS, STUART S				
ART UNIT 2629		PAPER NUMBER		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/523,381

Applicant(s)

CHILDS ET AL.

Examiner

Stuart McCommas

Art Unit

2629

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 September 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 3-8 and 10-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3-8, 10-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/4/2009 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 3-6, 8 and 10-22 are rejected under 35 U.S.C. 103(a) as being as being unpatentable over Inukai (United States Patent 6,680,577), hereinafter referenced as Inukai, in view of Hirane et al. (United States Patent 4,967,192), hereinafter referenced as Hirane.

Regarding claim 1, Inukai discloses an EL display device 101 including an array of display pixels 104 (figure 1A) where each pixel includes an EL display element 109 and a current source circuit including a transistor 108 and a capacitor 112 (figure 1B) for driving current through the EL display element 109 where the current through the EL

display element 109 depends on a data voltage (column 7 lines 45-58), and where the device is operable in several periods within a frame (figures 5A-5F, column 9 lines 29-36). Inukai further discloses that the first period has a first length and that during the first period a first current of a group of currents can be driven through the EL display element 109 (column 9 lines 21-36; figures 5A-5F). Inukai further discloses that the second period has a length different from the first period (Figure 5A-5F) and that during the second period a second current of a plurality of currents is driven through the EL display element 109 (column 9 lines 21-36) and that the first and second currents of the respective pluralities of drive currents can be selected independently of one another (column 3 lines 61-67; figure 5D). Further Inukai discloses that the current levels include zero and that the duration of one period is approximately n times the duration of the other phase where n is the number of drive currents that can be used in the display (figures 5A-5F; column 3 lines 25-40; column 8 lines 51-55). Further Inukai discloses wherein during said first phase each of the pixel display elements is sequential driven for said first duration with a corresponding one of said first plurality of drive current and during said second phase each of the pixel display elements is sequential driven for said second duration with a corresponding one of said second plurality of drive currents associated with said second phase (column 3 lines 11-67; column 4 lines 1-19; figures 5A-5E).

However Inukai fails to disclose more than two drive current levels and wherein the first plurality of drive current comprises a number n of drive current levels.

In a similar field of invention Hirane discloses more than two drive current levels or current volumes for a current driving method (column 4 lines 54-67; column 7 lines 48-63; column 8 lines 37-47; figure 3). Further Hirane discloses that the first plurality of drive currents comprises a number n of drive current levels (column 4 lines 54-67; column 7 lines 48-63; column 8 lines 37-47; figure 3; table 1).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Inukai with Hirane by specifically providing more than two drive current levels and wherein the first plurality of drive current comprises a number n of drive current levels for the purpose of improving the quality of the display by compensating for aging effects in the display (column 2 lines 46-51).

Regarding claim 3, Inukai and Hirane, the combination discloses everything as applied above, further Inukai discloses wherein n is 8. Specifically Inukai discloses N can be any integer greater than or equal to two (column 5 lines 38-53).

Regarding claim 4, Inukai and Hirane, the combination discloses everything as applied above, in addition Inukai discloses that the first plurality of drive currents is the same as the second plurality of drive currents where the gradation of a pixel is controlled by current where the display period is selected from a group of display periods corresponding to the current and a second display period is selected from the same group of display periods (column 3 lines 41-67; figure 5A-5F).

Regarding claim 5, Inukai and Hirane, the combination discloses everything as applied above, in addition Inukai discloses that the first plurality of drive currents

comprises a first number n of drive current levels for providing the lowest n non-zero brightness levels, where a first three bits (D4-D6) of a digital analog drive current value are used to provide the lowest nonzero brightness levels excluding zero brightness and where the second plurality of drive currents comprises a second number m of non-zero drive current levels for providing the higher n brightness levels, where a second three bits (D1-D3) can be used for controlling the highest brightness levels of a display to provide six combined brightness levels or $n+m$ total brightness levels (column 3 lines 25-60; figures 5A-5C).

Regarding claim 6, Inukai and Hirane, the combination discloses everything as applied above, in addition Inukai discloses a pixel circuit with a drive transistor (108), a storage capacitor for storing a gate voltage of the drive transistor (112), and an address transistor (105) for switching a data voltage to the gate of the drive transistor during an addressing phase (figure 1B).

Regarding claims 8-12, they disclose a **method** for implementing the **apparatus** of claims 1-6. Thus, claims 8-12 are an inherent variation of claims 1-6 and are interpreted and rejected for the same reasons as stated above (see claims 1-5).

Regarding claim 13, Inukai and Hirane, the combination discloses everything as applied above, in addition Inukai discloses that the first plurality of drive currents is the same as the second plurality of drive currents, where the gradation of a pixel is controlled by current where the display period is selected from a group of display periods corresponding to the current and a second display period is selected from the same group of display periods (column 3 lines 41-67; figure 5A-5F).

Regarding claim 14, Inukai and Hirane, the combination discloses everything as applied above, in addition Inukai discloses a pixel circuit with a drive transistor (108), a storage capacitor for storing a gate voltage of the drive transistor (112), and an address transistor (105) for switching a data voltage to the gate of the drive transistor during an addressing phase (figure 1B).

Regarding claim 15, Inukai and Hirane, the combination discloses everything as applied above, further Inukai discloses wherein only the first phase is used to provide the lowest n brightness levels (column 3 lines 25-40; column 5 lines 23-66; column 8 lines 51-55; column 9 lines 21-42; figures 5-8).

Regarding claim 16, Inukai and Hirane, the combination discloses everything as applied above, further Inukai discloses wherein only the second phase is used to provide the brightness levels higher than the lowest n brightness levels (column 3 lines 25-40; column 5 lines 23-66; column 8 lines 51-55; column 9 lines 21-42; figures 5-8).

Regarding claim 17, Inukai and Hirane, the combination discloses everything as applied above, further Inukai discloses where the first phase is used for higher resolution and the second phase is used for lower resolution (column 3 lines 25-40; column 5 lines 23-66; column 8 lines 51-55; column 9 lines 21-42; figures 5-8).

Regarding claim 18, Inukai and Hirane, the combination discloses everything as applied above, further Inukai discloses wherein a highest brightness level is provided by turning off drive currents during the first phase, and increasing a peak drive current in the second phase to a higher level than an allowable peak drive current in the first

phase during gradation display (column 3 lines 25-40; column 5 lines 23-66; column 8 lines 51-55; column 9 lines 21-42; figures 5-8).

Regarding claim 19, Inukai and Hirane, the combination discloses everything as applied above, further Inukai discloses wherein all the display pixels are addressed twice within the display period (column 3 lines 25-40; column 5 lines 23-66; column 8 lines 51-55; column 9 lines 21-42; figures 5-8).

Regarding claim 20, Inukai and Hirane, the combination discloses everything as applied above, further Inukai discloses wherein all the display pixels are addressed once row by row during the first phase, and are re-addressed in a same row by row order during the second phase (column 3 lines 25-40; column 5 lines 23-66; column 8 lines 51-55; column 9 lines 21-42; figures 5-8).

Regarding claims 21-22, they disclose a **method** for implementing the **apparatus** of claims 15-16 and 18. Thus, claims 21-22 are an inherent variation of claims 15-16 and 18 and are interpreted and rejected for the same reasons as stated above (see claims 15-16 and 18).

4. Claim 7 is rejected under 35 U.S.C. 103(a) as being as being unpatentable over Inukai in view of Hirane and further in view of Hack et al. (United States Patent Application Publication 2002/0030647), hereinafter referenced as Hack.

Regarding claim 7, Inukai and Hirane, the combination discloses everything as applied above, further the combination discloses the display device in claim 1, however the combination fails to disclose a portable electronic device.

In a similar field of invention Hack discloses a display in a portable electronic device (paragraph 69).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Inukai and Hirane with Hack by specifically providing a portable electronic device for the purpose of allowing a user to conveniently use a portable device with a display in a variety of locations.

Response to Arguments

5. Applicant's arguments have been considered but are not persuasive.

On pages 9-10, Applicant argues that Inukai does not disclose a first and second plurality of currents that may be applied in each display period.

The Examiner respectfully disagrees, because Inukai discloses that multiple sets of currents can be applied during the first and second phases in the display period (column 3 lines 11-67; column 4 lines 1-19; figures 5A-5E). Simply because Inukai does not specifically disclose the weighting mechanism used by the instant invention does not mean that Inukai does not disclose multiple currents being used during these phases.

On pages 10-11, Applicant argues that the combination of Inukai and Hirane would not be obvious, because using the levels in Hirane would render the multiple display periods in Inukai useless.

The Examiner respectfully disagrees, because Inukai discloses multiple display periods, and Hirane discloses multiple current levels, and one of ordinary skill in the art would have known that combining these two features to precisely control gradation

display would allow for more precise gradation control. Using both time and amplitude provide more precise control, and motivation for the combination can be found in Hirane in column 2 lines 46-51.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stuart McCommas whose telephone number is (571)270-3568. The examiner can normally be reached on Monday-Friday 9 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexander Eisen can be reached on (571)272-7687. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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SSM

/Alexander Eisen/

Supervisory Patent Examiner, Art Unit 2629